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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/608,315

06/26/2003

Hong Wang

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8791

7590

03/23/2007

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EXAMINER

TREAT, WILLIAM M

ART UNIT

PAPER NUMBER

2181

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/608,315

Applicant(s)

WANG ET AL.

Examiner

William M. Treat

Art Unit

2181

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11, 13, 14, 16-20 and 22-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13, 14, 16-20 and 22-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

Art Unit: 2181

1. Claims 1-11, 13-14, 16-20, and 22-29 are presented for examination.

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 3-6, 19, and 27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

4. Original claims 1, 17, and 25 did not include the limitation: "a microarchitecture implementation-specific representation of a portion of the first code, and a macroinstruction representation of the portion of the first code." The examiner cannot find written description, in applicants' original disclosure, supporting an embodiment in which applicants analyze compiled code and generate "a second code based on the first code, the second code including a microarchitecture implementation-specific representation of a portion of the first code, and a macroinstruction representation of the portion of the first code." For this reason the examiner considers the substance of the claims to be new matter.

5. The drawings are objected to because Fig. 1 is identified by applicants in their specification as prior art but is not designated as prior art in applicants' drawings.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement

Art Unit: 2181

drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the analysis of compiled code and generation of "a second code based on the first code, the second code including a microarchitecture implementation-specific representation of a portion of the first code, and a macroinstruction representation of the portion of the first code" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate

Art Unit: 2181

prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-11, 13-14, 16-20, and 22-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Slegel et al. (IBM's S/390 G5 Microprocessor Design).

9. Slegel taught the invention of exemplary claim 1 including: "a method, comprising: analyzing a first code; and generating a second code based on the first code, the second code including a microarchitecture implementation-specific representation of a portion of the first code, and a macroinstruction representation of the portion of the first code." The examiner would suggest applicants read the second

paragraph on the first page of the article; the section entitled "Microarchitecture"; the section entitled "L1 cache"; and the section entitled "Millicode", at a minimum, before responding. Note that in the last paragraph of the section entitled "L1 cache" Slegel taught: "The L1 cache unit also contains a 32-byte writeable millicode array containing the millicode for the most commonly used ESA/390 instructions implemented in millicode." It is the examiners' contention that the millicode array is a microarchitecture representation of ESA/390 (macro) instructions that will also be found in the L1 cache at some point in the execution of a given program and both constitute a portion of the second code generated.

10. As to claim 2, Slegel inherently taught: "the method of claim 1, wherein the first code comprises source code." The current, conventional practice is to get away from having programmers write macroinstruction and microinstruction code and have them write in a higher-level source code which is then compiled into macroinstructions and millicode. Without offering such capabilities IBM would be severely curtailing the potential market for its product.

11. As to claim 3, Slegel inherently taught: "the method of claim 1, wherein the first code comprises code compiled from source code for a given instruction set architecture (ISA). Note, in the second paragraph of the article, Slegel taught: "The G5 system implements the ESA/390 instruction-set architecture, which is based on and compatible with the original S/360 architecture introduced in 1964. While one might wish to recompile an S/360 program or at the very least optimize the compiled code for execution on the G5 system, Slegel is saying that at least some S/360 programs could

run (i.e., they are compatible) on the G5 system and could take advantage of the millicode routines in the L1 cache (i.e., there would be macroinstructions and microinstructions encompassing the same operations).

12. As to claim 4, Slegel taught: "the method of claim 3, wherein the second code further comprises the first code." As described in paragraph 10, *supra*, there would be the S/360 code in the L1 cache with instructions whose operations overlap the millicode in the millicode array.

13. As to claim 5, Slegel taught: "the method of claim 4, further comprising generating boundary markers to mark a beginning and an end for the alternative representation, the boundary markers being in a format of the ISA (Millicode section)." The 390 macroinstruction, which is recognized by the decoder as requiring millicode, acts as one boundary and the millicode instruction that acts as a hardwired subroutine return acts as the other boundary.

14. As to claim 6, Slegel taught: "the method of claim 5, further comprising generating a trigger instruction which when executed by a machine executing the second code causes the machine to execute the alternative representation instead of the first code, the trigger being in the format of the ISA. The trigger instruction is the 390 macroinstruction, which is recognized by the decoder as requiring millicode (Millicode section).

15. As to claim 7, Slegel taught: "the method of claim 1, wherein the alternative representation comprises microcode (fourth paragraph of Microarchitecture section)."

16. As to claim 8, Slegel taught "a machine-readable medium having stored thereon a sequence of instructions which when executed by a processor, cause the processor to perform a set of operations comprising: generating compiled code for a given ISA, the compiled code including a) discrete regions of microarchitecture implementation-specific code bounded by ISA format markers and b) macroinstructions outside the discrete regions (Millicode section)." Slegel taught that "The millicode instruction set consists of all the ESA/390 hardware instructions plus 102 instructions that only millicode can use." He also taught there were either more complex instructions or relatively infrequently used ESA/390 macroinstructions which would appear in the compiled code with the hardwired/millicode/microinstructions of the ESA/390 instruction set. Applicant is only claiming some parts of the code are microinstructions and some parts are macroinstructions which Slegel must inherently have.

17. As to claim 9, see paragraph 8, *supra*.

18. As to claim 10, see paragraph 13, *supra*.

19. As to claim 11, see paragraph 15, *supra*.

20. As to claim 13, inherently, the circuitry of Slegel's system must decode the instructions to obtain appropriate operands and execute them.

21. As to claims 14, 16-20, and 22-23, they fail to teach or define over rejected claims 1-11 and 13.

22. As to claim 24, the S360 code mentioned in the second paragraph and the ESA/390 code, while similar, are still different ISA's.




Art Unit: 2181

23. As to claims 25-29, they fail to teach or define over rejected claims 1-11, 13-14, 16-20, and 22-24.

24. Applicant's arguments with respect to claims 1-11, 13-14, 16-20, and 22-29 have been considered but are moot in view of the new ground(s) of rejection.

25. Any inquiry concerning this communication should be directed to William M. Treat at telephone number (571) 272-4175.

26. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**WILLIAM M. TREAT**  
**PRIMARY EXAMINER**